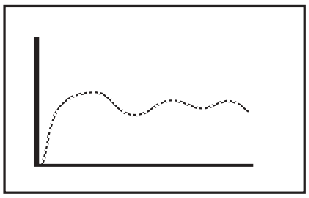
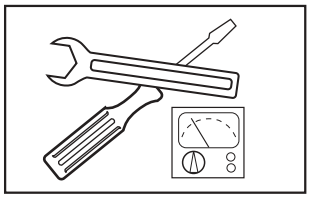
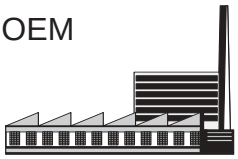
❑ NEW
❑ supplement to .....
☒ replaces 2.A123-990201-ENG





OEM



2.+4.+6. A123 – MFT–H–2/ENG

Operating Instructions MFT-H
Handy for MFT/MFT2 actuators

Safety notes on using the MFT-H

- When connecting-up to the actuator circuit, take great care not to allow the connecting lead to come into contact with mains power. Also ensure correct terminal assignment.

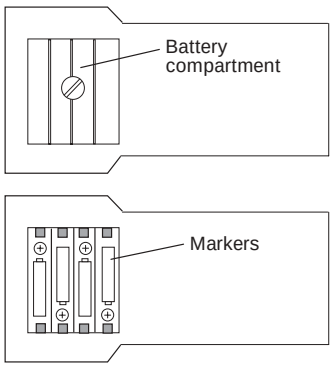
- The MFT-H is not isolated electrically from the RS232 interface or the actuator.
- Only approved computers that provide electrical isolation from the mains may be connected to the RS232 interface.

- Use only leak-proof alkaline batteries of Size AA (Mignon, LR6: dimensions 50x14 mm) or suitable NiCd or NiMH rechargeable batteries.
- All four units must be replaced at the same time when changing the batteries.
- Ensure correct polarity when fitting the batteries. Always use four identical batteries of the same make and type.
- Remove the batteries if the MFT-H is to remain unused for an extended period of time

- The device contains no replaceable components apart from the batteries.

Fitting the batteries

1. Turn the MFT-H over to expose the back.
2. Open the battery compartment with a screwdriver or coin.
3. Fit the batteries in the compartment as indicated by the markers and close the compartment again.



Actuators parameterisable with MFT-H

All multifunctional and bus-capable actuators (MFT- / MFT2 actuators as well as the VAV compact NMV-D2M can be parameterised with the MFT-H. The damper actuator AM24-SR (multifunctional, but not bus-capable) can also be parameterised with the MFT-H.

What do ‘MFT’ and ‘MFT2’ mean?

MFT and MFT2 actuators employ **M**ulti **F**unction **T**echnology and both types can be parameterised using the MFT-H Handy parameter assignment device. MFT(2) actuators can be controlled either conventionally or through the Belimo MP-Bus system. The actuator AM24-SR is not bus-capable. When used in a bus system each MFT / MFT2 actuator can also be linked to a sensor. The value provided by the sensor is acquired by the actuator and transferred to the MP-Bus system. MFT actuators can be linked to active sensors (DC 0-10 V output) and ON/OFF switches. MFT2 actuators can also be linked to passive resistance-type sensors (e.g. Pt 1000 devices). More information on sensor linking will be found in Product Information Document 2. + 6. MFT2-1.

Important: Assigning parameters to MFT(2) damper actuators

MFT(2) actuators (**M**ulti-**F**unction **T**echnology) undergo basic parameter assignment for standard applications before being despatched from the factory. When necessary for his own purposes, the user can make on-site alterations to MFT(2) actuator parameters using the MFT Handy. However, when such reassignment of parameters is undertaken, the user will be responsible for ensuring that the settings are correct so as to provide proper functioning of the MFT(2) actuators. The final values of any new parameters should be marked on the MFT(2) actuators upon completion.

Contents

Brief description MFT-H	4
Technical data / Accessoires	4
Connection options / Wiring	5
Powering up / down, Fault alarms	6
Using the tree-menus	7
Tree menu: NM24-MFT(2) AM24-MFT(2), AM24-SR GM24-MFT(2)	8
Tree menu: LF24-MFT(2) AF24-MFT(2)	9
Tree menu: NV24-MFT(2) NVF24-MFT(2) NVF24-MFT(2)-E	10
Tree menu: NMV-DM2	11

Description of menu functions Actuator A

A1 Default functions	12-13
A2 Modify / A2.1 Control	14
A2 Modify / A2.2 Feedback	15
A2 Modify / A2.3 Motion	16
A2 Modify / A2.4 Copy	17
A2 Modify / A2.5 Reset	17
A3 Service	18
MFT-H settings E	19
MP - adressing	20

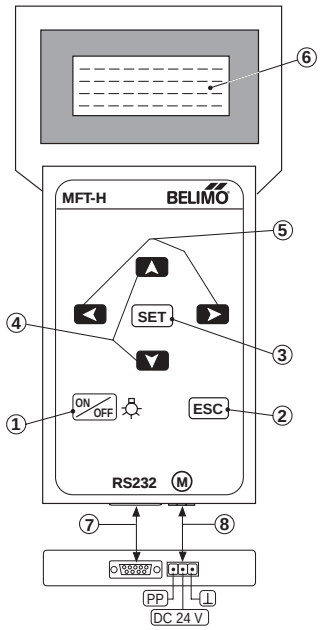
Example of parameter assignment

Example of an SRS function	21

Appendix

Instructions for a Handy software upgrade	22-23

Operating controls



Operating controls	Action
① **ON/OFF** switch and display illumination	Press to toggle On and Off Press for at least 2 s to illuminate display (MFT-H must be powered up first)
② **ESC** Escape Key	Press briefly once to move back one level in the menu Press for at least 2 s to return to the main menu
③ **SET** Memory Key	Jump to selected menu Enter selected command
④ ▼ ▲ Direction Keys	For moving the cursor to the next line or the previous line of the menu. When there are up to 3 selected steps per menu, the cursor will jump from line to line. When there are more than 3 selected steps it will scroll one line at a time each time a key is pressed. The longer the keys are held depressed the faster will be the scrolling. An audible signal is given when the last line of the menu is reached with the key pressed.
⑤ ◄ ► Direction Keys	For selecting steps in the menus when there are several side-by-side.
⑥ **LCD Display**	4-line
⑦ **RS232 connection**	Level converter PP or MP to RS232 Software upgrade MFT-H
⑧ Ⓜ	Connection to MFT(2) actuator

Parameter assignment by MFT-H
MFT(2) actuators (Multi-Function Technology) undergo basic parameter assignment for standard applications before being despatched from the factory. When necessary, on-site alterations can be made to MFT(2) actuator parameters using the MFT-H Parameter Assignment Device. The kind of functions that can be set depends on the type of MFT(2) actuator being used.

Checking service functions with the MFT-H
The MFT-H can be used for checking the functions of MFT(2) actuators. Either the values that have been previously assigned can be read out or the actuator itself can be operated with the MFT-H in order to check its functions.

Operating the MFT-H
No special knowledge of programming is needed. The device is used interactively by means of its 4-line display and keypad. The procedure is based on the menu method which guides the operator through the tree menu step-by-step. It almost completely eliminates any chance of making mistakes. In the various menus and sub-menus the operator can define the functions or parameters required. Implausible values will not be accepted by the MFT-H.
The language of communication to be used by the device can be preselected.

Technical data	MFT-H
Power supply	4 ordinary Mignon alkaline batteries 1.5 V, AA Size, LR6 or rechargeable NiCd batteries can be used
Minimum voltage	An alarm appears on the display if the battery voltage falls below 4.2 V
Connections • Power and PP/MP • RS232	 3-pole motor plug-connector D-Sub 9 pole / female
Display	LCD 4-line
Communications	PP/MP
Safety class	⧫ (safety extra-low voltage)
Ambient temperature range	0 °C...+50 °C
Maintenance	Maintenance-free
Case	ABS plastic (210 x 100 x 50 mm)
Weight	350 g

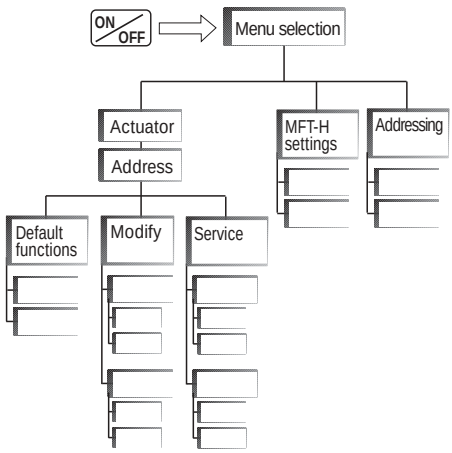
Accessories included	MFT-H – SET

- 1 Special adapter with compression terminals, type MFT-C
- 1 Motor connecting lead, 2-pole with motor plug-connector and two 4 mm dia. plugs
- 1 Power pack 24 V, type ZN230-24
- 4 Mignon alkaline batteries
- 2 Sheets of labels with 48 stickers on each (Item No. 31720) incl. Waterproof felt-tip pen

Optional (Not included in the MFT-H - SET)

Motor plug-connector, 3-pole for customised connecting lead, Item No. 11783

Tree menu (principle)



The MFT-H as level converter
The MFT-H can be used as a level converter between RS 232 and PP interfaces (ZIP function).

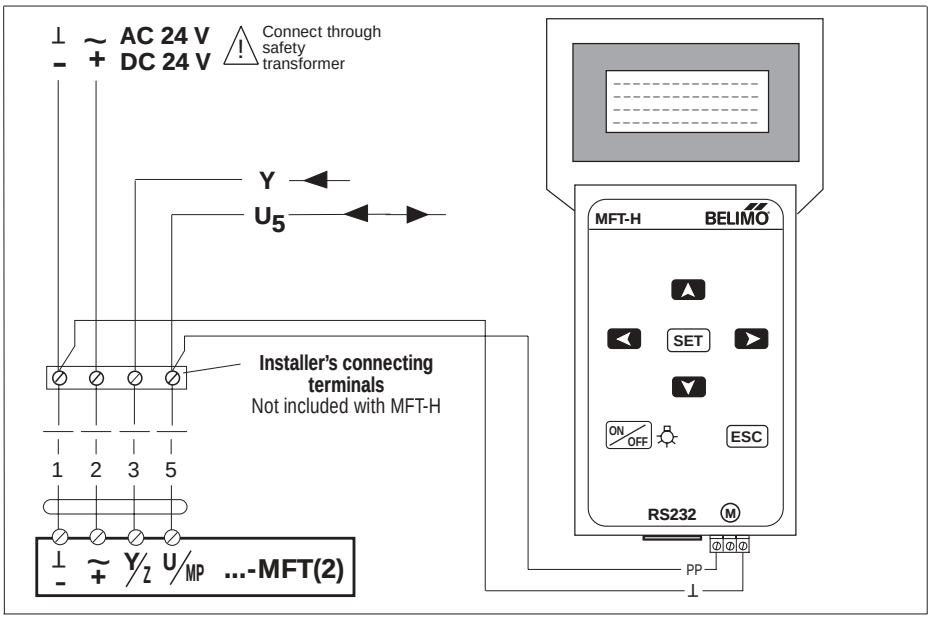


Diagram 1
Typical application:
For assigning parameters to an MFT(2) actuator when it is already connected into the overall system.
In this application the actuator is under analogue control through the Y-signal.

Notes:
- The MFT-H receives power from its own batteries.
- The MFT(2) actuator receives power from the overall system.
- The MFT(2) actuator is operable.
- As long as the U/PP terminal of the MFT(2) actuator is connected to the MFT-H, the feedback signal U5 will not correspond to the instantaneous actual value.

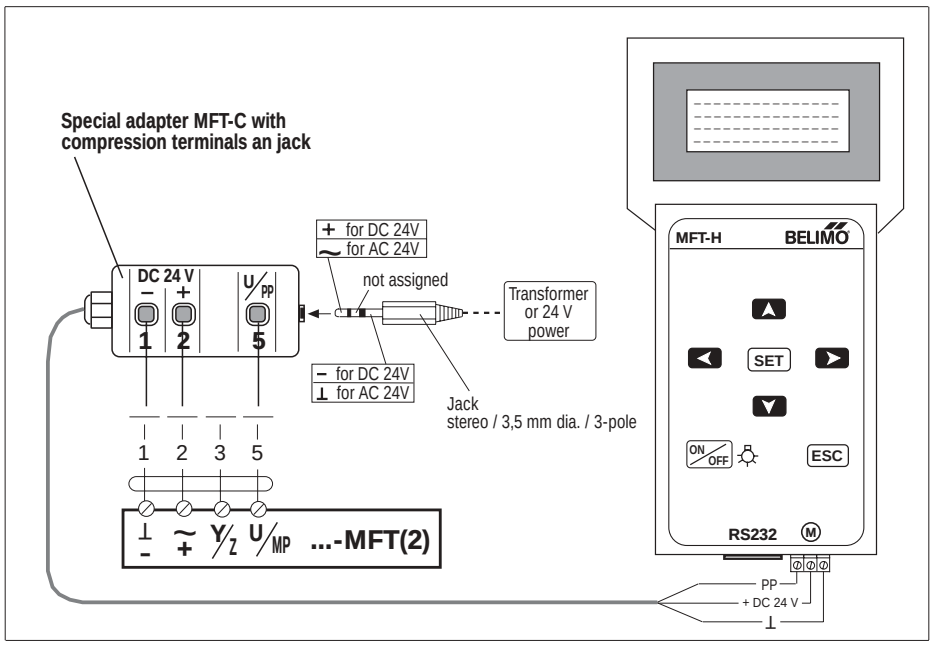


Diagram 2
Typical application:
For assigning parameters to an MFT(2) actuator before it is connected into the overall system.
Suitable as well for assigning the same parameters to several MFT(2) actuators.

Notes:
- The MFT-H receives power from its own batteries.
- The MFT(2) actuator receives power from the MFT-H during parameter assignment.
- The MFT(2) actuator is only fully operable when it is receiving an external supply of power via the jack.
- Providing an external supply of power to the MFT(2) actuator via the special adapter greatly extends the life of the MFT-H batteries.

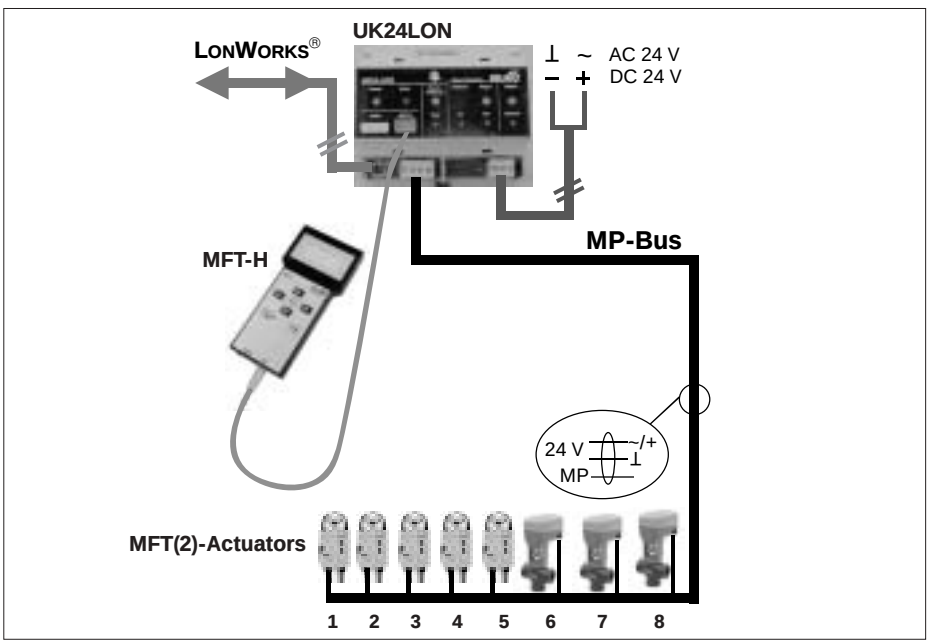
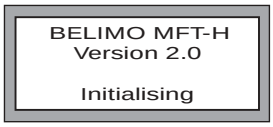


Diagram 3
Typical application:
For assigning parameters to an MFT(2) actuator when it is connected together with other actuators (up to a total of 8) via an MP-Bus system to a UK24LON unit. In this application the MFT(2) actuators are controlled digitally over the MP-Bus.

Notes:
- The MFT-H receives power from its own batteries.
- The MFT(2) actuators receive power via the UK24LON unit.
- Use the MFT-H to select MP addresses 1...8 in order to gain direct access to the required actuator.

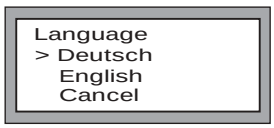
Powering up/down

When an MFT-H Handy is powered up it is first initialised and the version of software with which it is loaded is displayed.

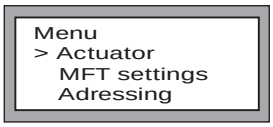


The subsequent behaviour of the Handy varies according to whether it is a first commissioning or a restart:

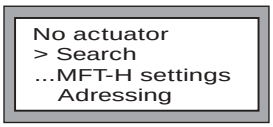
First power-up/First commissioning:
When a Handy is powered up for the first time it jumps directly to the “Language” menu after initialising. This allows the appropriate language of use to be selected.



Restart:
– on the same actuator:
When the Handy is powered up again it jumps to the same menu item that it was at before it was powered down, provided it is connected to the same actuator as before (i.e. the Serial No. and Address correspond).



– on a different actuator:
If a different actuator is connected to the Handy before it is powered up again the fault alarm “No actuator” appears on the display and an audible beep signal is given. If the actuator has already been addressed, enter the correct address under “Search” on the menu and the Handy will find the actuator in question. Otherwise it will first be necessary to assign an address to the actuator; see “Addressing”, Page ... .



Auto power-down:
If, when a Handy is in use, none of its keys is pressed for a period of 5 minutes, it will power down automatically.

Fault alarms

Any faults that occur are always identified by an alarm on the display and also by an audible beep signal.

Alarms for exhausted batteries
When its batteries become exhausted (<4.2 V) the Handy generates an alarm on its display in the form of a flashing battery symbol. In order to avoid any loss of data the batteries must be replaced without delay.

If necessary, the alarm signal can be acknowledged with the SET key so that any parameter assignment task that has been started can be completed first. Although the status message will disappear from the display the battery symbol will continue flashing. If the batteries are not replaced the fault alarm will appear again as soon as the Handy is powered up again.

Communication and system fault alarms

Message	Possible causes of faults	Fault rectification
No actuator	Wiring error	• Check wiring • Check address • Repeat command
No reply from actuator		
Defective transmission		
Programming error		
No EEPROM access	MFT(2) actuator defective	Change MFT(2) actuator
Command not recognised	MFT-H software version does not match that of the MFT(2) actuator	Ascertain software versions of MFT-H and MFT(2) actuator and consult Belimo
Enter password:	Input is password-protected	Enter password and start
Access denied	Belimo-barred input	Contact Belimo

Specific configuration table

According to the particular application each MFT(2) actuator has a specific configuration table and the corresponding preset values stored in its memory.
This configuration determines which menu items in the MFT-H Handy can be selected and which values can be modified.
As soon as the Handy is connected to an MFT(2) actuator it downloads the data configuration from the actuator.

Four different tree-menus

For parameter assignment purposes there are four different tree-menus available for different groups of products which the user can turn to for assistance when he is parameterising a particular actuator:

1 **Tree-menu for parameterising MFT(2) damper actuators without a safety function**



NM24-MFT(2)	AM24-MFT(2)	GM24-MFT(2)
8 Nm	18 Nm	36 Nm

Tree-menu see page 8

Tree-menu also valid for AM24-SR

2 **Tree-menu for parameterising MFT(2) damper actuators with a safety function**


LF24-MFT(2)	AF24-MFT(2)
4 Nm	15 Nm

Tree-menu see page 9

3 **Tree-menu for parameterising MFT(2) valve actuators NV… without and NVF… with a safety function**



NV24-MFT(2)	NVF24-MFT(2)	NVF24-MFT(2)-E
800 N	800 N	800 N

Tree-menu see page 10

4 **Tree-menu for parameterising VAV-Compact NMV-D2M**

NMV-D2M
8 Nm

Tree-menu see page 11

Tree-menu for parameterising MFT(2) damper actuators without a safety function and for the AM24-SR

NM24-MFT(2)	AM24-MFT(2)	GM24-MFT(2)
8 Nm	18 Nm	36 Nm

- Menu selection
  - Actuator
  - Address — Select MP-address 1–8. PP when only 1 actuator. Select PP for the AM24-SR!
  - Default functions
    - SR (DC 2...10 V)
    - PWM (0.59-2,93s)
    - 3-point
    - Open/Close
    - VAV (6 ± 4 V)

    → Description of individual functions pp. 12 & 13
  - Modify
    - Control
      - DC control
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
        - PWM control
          - 0.02 – 5s
          - 0.59 – 2.93s
          - 0.1 – 25.5s
          - PWM variable
            - PW min ..... PW max .....
        - 3-point
        - Open/Close

      → Description of individual functions page 14
    - Feedback
      - Voltage U
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
        - Softswitch S ②
          - S1 ..... S2 .....
        - Alarms (S; W; –)
        - Stop/Go-Ratio
        - Mech. Overload ②
        - Travel ②
        - Alarms & U
        - Alarms & S

      → Description of individual functions page 15
    - Motion
      - Torque
        - 100 %
        - 75 % ④
        - 50 %
        - 25 % ④
      - Running time
        - Standard
        - variable
          - ...s 100% rotation
      - CW or CCW ③
        - Normal
        - Reverse
      - Rotation ②
        - Minimum
          - Rotation ...%
        - Intermediate
          - Rotation ...%
        - Maximum
          - Rotation ...%
      - Adaption
        - Off (Default)
        - Manual
        - Auto

      → Description of individual functions page 16
    - Copy
      - Enter original
      - copy

      → Description of individual functions page 17
    - Reset
      - Last entry
      - All entries

      → Description of individual functions page 17
  - Service
    - Identification
      - Serial No.
      - Typ/ SW version
      - Plant site .....
    - Reference/Actual value
    - Adapte
    - Function info
    - Data log ①
    - Alarms
      - Delete
    - Function test
    - Sensitivity
      - Normal (Default)
      - Reduced
    - Synchronisation
      - Normal
      - Sync. at 0%
      - Sync. at 100%

    → Description of individual functions page 18
  - MFT-H settings
    - Language
      - German
      - English
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
    - PP-interface
    - Software
      - SW version

    → Description of individual functions page 19
  - Addressing ⑤
    - Address

    → Description of individual functions page 20

Menu does not appear when "VAV (6 ± 4 V)" is selected under Basic Functions!

① Operating time, active time, Stop/Go ratio
② When the angle of rotation is limited mechanically the angle must be adapted electronically in order to ensure the proper functions
③ HW + SW direction of rotation changes produce virtual changes for switching points and Z control (= position settings are reversed)
④ Not for AM24-SR
⑤ AM24-SR cannot be addressed

Tree-menu for parameterising MFT(2) damper actuators with a safety function

LF24-MFT(2)	AF24-MFT(2)
4 Nm	15 Nm

- Menu selection
  - Actuator
  - Address — Select MP-address 1–8. PP when only 1 actuator.
  - Default functions
    - SR (DC 2...10 V)
    - PWM (0.59-2,93s)
    - 3-point
    - Open/Close
    - VAV (6 ± 4 V)

    Description of individual functions pp. 12 & 13
  - Modify
    - Control
      - DC control
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
      - PWM control
        - 0.02 – 5s
        - 0.59 – 2.93s
        - 0.1 – 25.5s
        - PWM variable
          - PW min ..... PW max .....
      - 3-point
      - Open/Close

      Description of individual functions page 14
    - Feedback
      - Voltage 0
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
      - Softswitch S ②
        - S1 ..... S2 .....
      - Alarms (S; W; –)
      - Stop/Go-Ratio
      - Mech. Overload ②
      - Travel ②
      - Alarms & U
      - Alarms & S

      Description of individual functions page 15
    - Motion
      - Torque
        - ** Cannot be modified
        - ** Cannot be modified. Spare menu item.
      - Running time
        - Standard
        - variable
          - ...s 100% rotation
      - CW or CCW ③
        - Normal
        - Reverse
      - Rotation ②
        - Minimum
          - Rotation ...%
        - Intermediate
          - Rotation ...%
        - Maximum
          - Rotation ...%
      - Adaption
        - Off (Default)
        - Manual
        - Auto

      Description of individual functions page 16
    - Copy
      - Enter original
      - copy

      Description of individual functions page 17
    - Reset
      - Last entry
      - All entries

      Description of individual functions page 17
  - Service
    - Identification
      - Serial No.
      - Typ/ SW version
      - Plant site .....
    - Reference/Actual value
    - Adapte
    - Function-info
    - Data log ①
    - Alarms
      - Delete
    - Function test
    - Sensitivity
      - Normal (Default)
      - Reduced
    - Synchronisation
      - Normal
      - Sync. at 0%
      - Sync. at 100%

    Description of individual functions page 18
  - MFT-H settings
    - Language
      - German
      - English
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
    - PP-interface
    - Software
      - SW version

    Description of individual functions page 19
  - Addressing
    - Address

    Description of individual functions page 20

Menu does not appear when “VAV (6 ± 4 V)” is selected under Basic Functions!

① Operating time, active time, Stop/Go ratio
② When the angle of rotation is limited mechanically the angle must be adapted electronically in order to ensure the proper functions
③ HW + SW direction of rotation changes produce virtual changes for switching points and Z control (= position settings are reversed)

Tree-menu for parameterising MFT(2) valve actuators NV… without and NVF… with a safety function

NV24-MFT(2)	NVF24-MFT(2)	NVF24-MFT(2)-E
800 N	800 N	800 N

① Operating time, active time, Stop/Go ratio
② With NVF... actuators the actuating force cannot be modified (the appropriate menus do not appear).
③ HW + SW direction of rotation changes produce virtual changes for switching points and Z control (= position settings are reversed)

Tree-menu for parameterising VAV-Compact NMV-D2M

NMV-D2M
8 Nm

- Menu selection
  - Actuator
    - Address — Select MP-address 1–8. PP when only 1 actuator.
  - Default functions
    - SR (DC 2...10 V)
    - Description of individual functions pp. 12 & 13
  - Modify
    - Control
      - DC control
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
      - Description of individual functions page 14
    - Feedback
      - Voltage U
        - DC 2 – 10 V (Default)
        - DC 0 – 10 V
        - DCV variable
          - Start ..... Stop .....
      - Description of individual functions page 15
    - Motion
      - Torque
        - 100 %
        - 75 %
        - 50 %
        - 25 %
      - Running time ⑦
        - Standard
        - Variable
          - ...s 100% Range
      - CW or CCW ③
        - Normal
        - Reverse
      - Volumetric flow ②
        - Minimum
          - Volumetric flow ...%
        - Intermediate
          - Volumetric flow ...%
        - Maximum
          - Volumetric flow ...%
      - Adaption
        - Off (Default)
        - Manual
        - Auto
      - Description of individual functions page 16
    - Copy
      - Enter original
      - copy
      - Description of individual functions page 17
    - Reset
      - Last entry
      - All entries
      - Reset original
      - Description of individual functions page 17
  - Service
    - Identification
      - Serial No.
      - Typ/ SW version
      - Plant site .....
    - Reference/ Actual value ⑥
    - Adapte
    - Function info
    - Data log ①
    - Alarms
      - Delete
    - Function test
    - Sensitivity
      - Normal (Default)
      - Reduced
    - Description of individual functions page 18
  - MFT-H settings
    - Language
      - German
      - English
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
      - further languages in preparation
    - PP-interface
    - Software
      - SW version
    - Description of individual functions page 19
  - Addressing
    - Address
    - Description of individual functions page 20

① Operating time, active time, Stop/Go ratio

② When the angle of rotation is limited mechanically the angle must be adapted electronically in order to ensure the proper functions

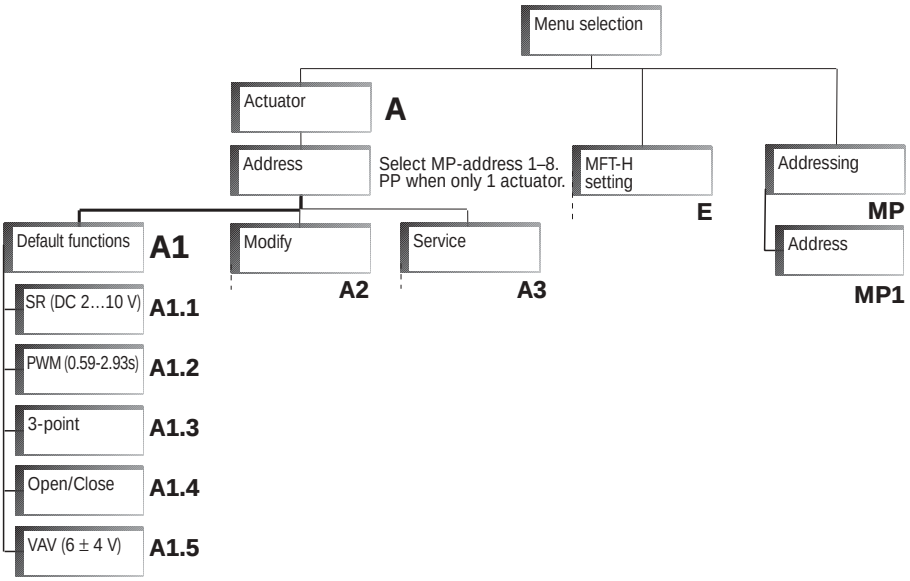
③ HW + SW direction of rotation changes produce virtual changes for switching points and Z control (= position settings are reversed)

④ Settings for the electrical working range for volumetric flow.

⑤ Settings for the U5 voltage signal output for 0...100% nominal volumetric flow.

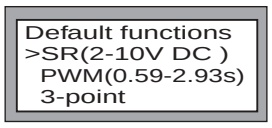
⑥ Reference value and actual value as % of nominal volumetric flow. Calculation of actual volumetric flow [m^3/h]:
V_{ACT} [m^3/h] = V_{NOM}- [m^3/h] / 100 x V_{ACT} [%]

⑦ The set value of running time has no effect on normal control. Settings are only active for override control.



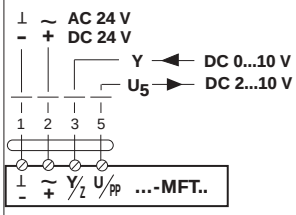
In the **Default functions** branch of the tree menu it is possible to assign so-called 'default' or standard functions to MFT(2) actuators. For each default function a data record containing the normal standard parameters for the function is stored. The appropriate function can be selected with the ▼ ▲ direction keys. Pressing the SET key enters the function into the actuator together with its data record. A warning appears on the display first which must be acknowledged by pressing the SET key again.

A1.1 Default function SR (DC 2...10 V)
Selecting this function parameterises the MFT(2) actuator for the modulating mode.



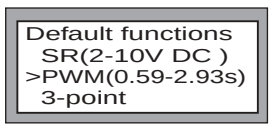
Display

Wiring diagram **SR**



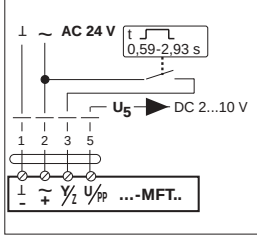
Data record SR (DC 2...10 V) (Example AM24-MFT(2))		
Working range	2...10 V DC	
Function Feedback U5	2...10 V DC	
Torque	18 Nm min.	
Angle of rotation	95°	
Running time	150 s	
Angle of rotation adaption	none	
Overrides (referred to full angle of rotation 95°)	Min. (min. position)	= 0%
	IP (intermediate position)	= 50%
	Max. (max. position)	= 100%

A1.2 Default function PWM (0.59-2.93s)
Selecting this function parameterises the MFT(2) actuator for the PWM mode.



Display

Wiring diagram **PWM**



Explaining PWM control:
PWM does not mean 'pulse width modulation' in its normal sense. The actuator measures the length of the control pulse and then moves to the corresponding position. So far, PWM-type actuators are only being used in the USA. Depending on the type of actuator, the user can define various PWM ranges.

Examples of PWM control when a PWM range of 0.59-2.93s has been selected for the actuator:

Example 1, 100% angle of rotation
When a pulse of 2.93s duration is sent to the actuator it causes it to move to the 100% angle-of-rotation position. (If the pulses sent to the actuator are of longer duration than 2.93 s the actuator will also move to the 100% angle-of-rotation position).

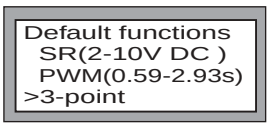
Example 2, 50% angle of rotation
When a pulse of 0.59s + (2.93s - 0.59s) / 2 = 1.17 s + 0.59 s duration is sent to the actuator it causes it to move to the 50% angle-of-rotation position.

Example 3, 0% angle of rotation
When a pulse of 0.59 s duration is sent to the actuator it causes it to move to the 0% angle-of-rotation position. (If the pulses sent to the actuator are of shorter duration than 0.59s but longer duration than 20 ms the actuator will also move to the 0% angle-of-rotation position; at less than 20 ms there is no defined function).

Data record PWM (0,59-2,93s) (Example AM24-MFT(2))	
Control signal Y	PWM
Working range	0.59-2.93s
Function Feedback U5	2...10 V DC
Torque	18 Nm min.
Angle of rotation	95º
Running time	150 s
Angle-of-rotation adaption	none

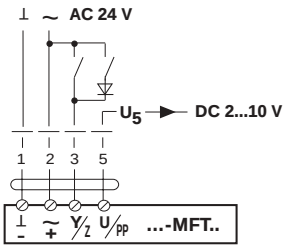
A1.3 Default function 3-point

Selecting this function parameterises the MFT(2) actuator for the 3-point control mode.



Display

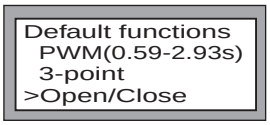
Wiring diagram **3-point**



Data record 3-point (Example AM24-MFT(2))	
Control signal Y	3-point
Function	
Feedback U5	DC 2...10 V
Torque	18 Nm min.
Angle of rotation	95°
Running time	150 s
Angle of rotation adaption	none

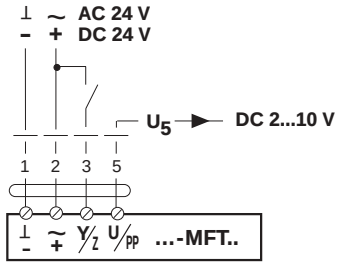
A1.4 Default function Open/Close

Selecting this function parameterises the MFT(2) actuator for the Open/Close mode



Display

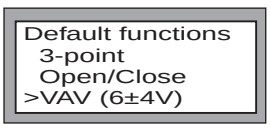
Wiring diagram **Open/Close**



Data record Open/Close (Example AM24-MFT(2))	
Control signal Y	Open/Close
Function	
Feedback U5	DC 2...10 V
Torque	18 Nm min.
Angle of rotation	95°
Running time	150 s
Angle of rotation adaption	none

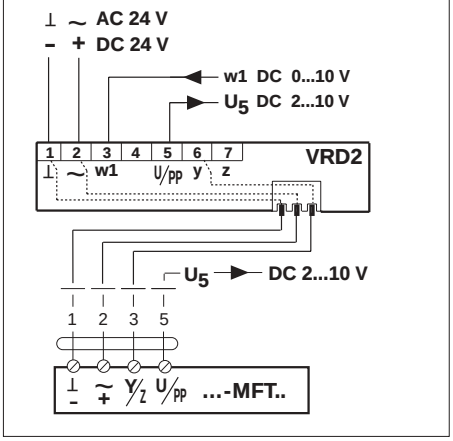
A1.5 Default function VAV (6 ± 4V)

Selecting this function parameterises the MFT(2) actuator for the VAV control mode.



Display

Wiring diagram **VAV**

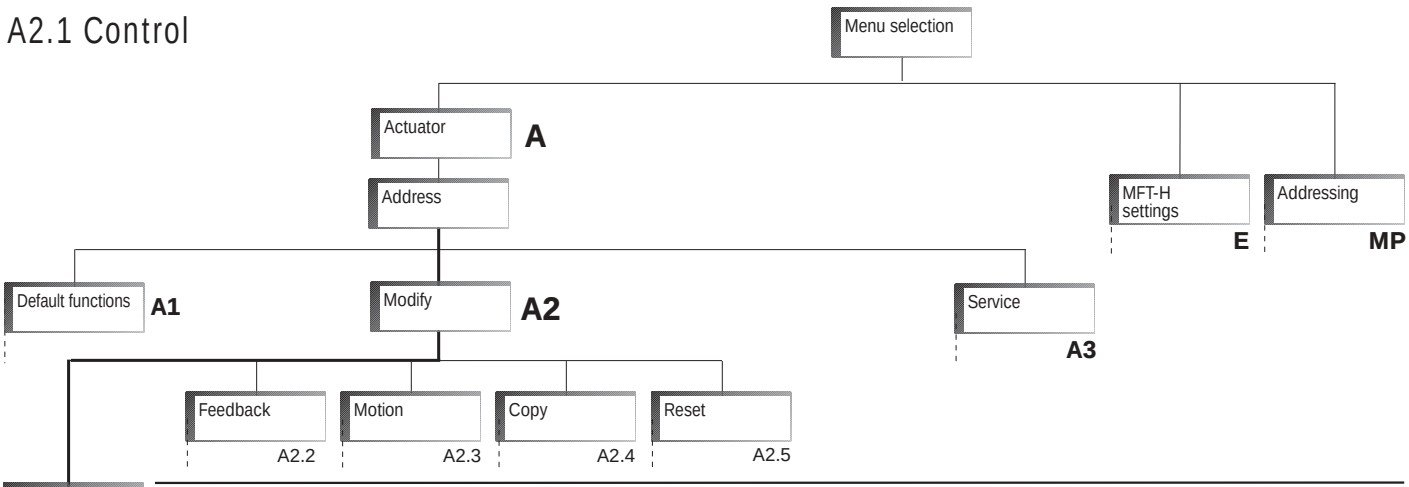


Data record VAV (6± 4V) (Example AM24-MFT(2))	
Control signal Y	From VAV controller
Function	
Feedback U5	DC 2...10 V
Operating range	6± 4V
Torque	18 Nm min.
Angle of rotation	95°
Running time	150 s
Angle of rotation adaption	none

The **Modify** branch of the tree menu allows the values and functions of an MFT(2) actuator to be custom-parameterised when necessary (see p. 21 Example of parameter assignment).

When the **Modify** branch of the menu is first entered it will always show the values and functions that were given to an MFT(2) actuator the last time it was assigned parameters. If a modification of a particular default function (A1.x) only involves changing a few individual values from their default settings, it is advisable to load the MFT(2) actuator with the appropriate default function (see page 12) before making the modification.

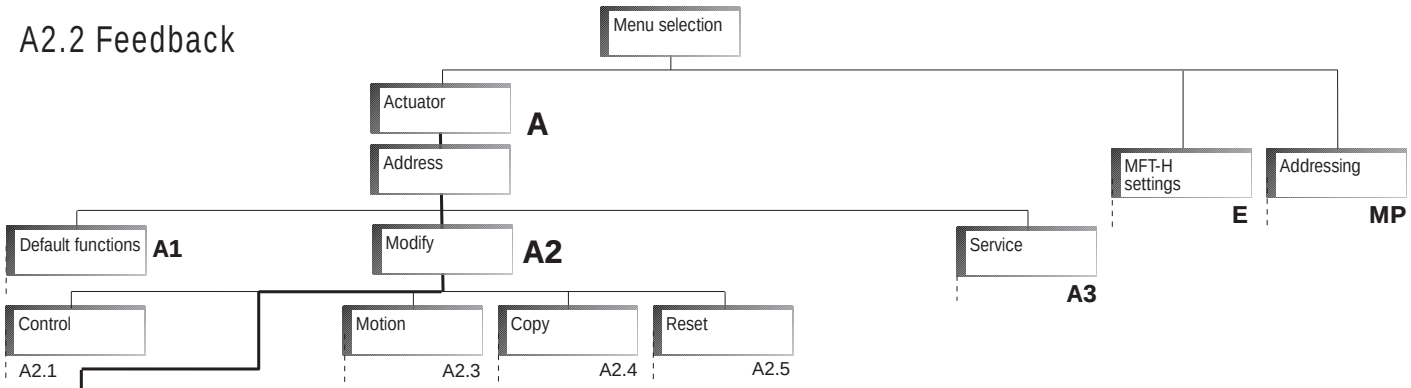
A2.1 Control



Control	**A2.1**	**Control** allows appropriate working ranges to be defined for control modes
DC control	**A2.1.1**	Selection of modulating control: The settings correspond to the electrical working range for 0...100% angle of rotation or stroke, in the case of VAV-Compact NMV-D2M = 0...100% nominal volumetric flow (V_{NOM}) effect on working range if **MAX** and/or **MIN** positions (see Page 16, A2.3.4) are selected. The working range corresponds to the control range set with the MIN and MAX positions. The set **MIN position** corresponds to the Start point of the working range. The set **MAX position** corresponds to the Finish point of the working range. (For the VAV-Compact NMV-D2M the MIN position corresponds to the minimum volumetric flow V_{MIN} and the MAX position to the maximum volumetric flow V_{MAX})
DC 2 – 10 V (Default)	A2.1.1a	Selection of a fixed working range DC 2...10 V (as per SR (DC 2-10 V) see page 12, Section A1.1)
DC 0 – 10 V	A2.1.1b	Selection of a fixed working range DC 0.5...10 V
DCV variable Start ..... Stop	A2.1.1c	Variable definition of a working range : • Start DC 0.5...30.0 V; Finish DC 2.5...32.0 V • For the VAV-Compact NMV-D2M : Start point DC 0...30.0 V and Finish point DC 2.0...32.0 V Finish must be at least 2 V above Start!
PWM control	**A2.1.2**	Selection of PWM control (MFT(2) actuator parameterised for PWM control) (see page 12, A1.2 Explaining PWM control)
0.02 – 5s	A2.1.2a	Selection of a fixed PWM working range of 0.02...5s
0.59 – 2.93s	A2.1.2b	Selection of a fixed PWM working range of 0.59...2.93s
0.1 – 25.5s	A2.1.2c	Selection of a fixed PWM working range of 0.1...25.5
PWM variable PWmin ..... PWmax	A2.1.1d	Variable definition of a PWM working range: PWMmin. 0.02 s..... PWMmax. 50.00 s
3-point	**A2.1.3**	Selection of 3-point control. MFT(2) actuator parameterised with data record for 3-point actuator (see page 13, Section A1.3)
Open/Close	**A2.1.4**	Selection of Open/Close control. MFT(2) actuator parameterised with data record for Open/Close actuator (see page 13, Section A1.4)

The mode of control required is selected with the direction keys ▼ ▲ and a variable working range with the direction keys ◀ ▶ and ◀ ▶. Pressing the SET key either causes the menu to jump to the next sub-menu or the selected values are entered into the actuator.

A2.2 Feedback



Feedback **A2.2** The **Feedback** branch of the tree menu allows the function of the [5] – **U5** → feedback signal to be defined.

Voltage U **A2.2.1** Selection of feedback signal U5 as a modulating linear DC measured voltage: The defined signals correspond to 0...100% angle of rotation or stroke. For the NMV-D2M the signals correspond to the actual value of volumetric flow in 0...100% referred to V_{NENN}.

DC 2 – 10 V (Default) A2.2.1a Select a fixed range of DC 2...10 V [5] – **U5** →

DC 0 – 10 V A2.2.1b Select a fixed range of DC 0.5...10 V [5] – **U5** →

DCV variable A2.2.1c Variable definition of the DC measuring voltage signal:
- Start DC 0.5… 8.0 V; Finish DC 2.5… 10.0 V
- For the VAV-Compact NMV-D2M: Start point DC 0...8.0 V and Finish point DC 2.0...10.0 V

Finish must be at least 2 V above Start!

Start ..... **Stop** .....

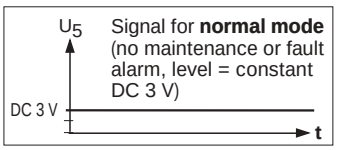
Softswitch S ② **A2.2.2** Select feedback signal U5 as softswitches S1 and S2. Referred to the effective mechanical angle of rotation or stroke of the MFT(2) actuator, it is possible to define 2 soft switching points (S1 and S2). The level of the DC voltage of U5 varies according to the angle of rotation or stroke executed and the S1 or S2 switching points reached.

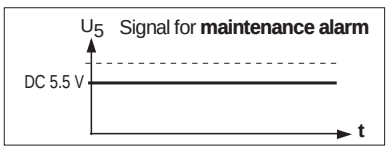
Actuator position below set value of S1 : **Level U5 = constant DC 4 V**
Actuator position above set value of S1 and below set value of S2 : **Level U5 = constant DC 7 V**
Actuator position above set value of S2 : **Level U5 = constant DC 10 V**

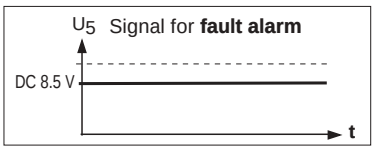
S1 ..... **S2** ..... A2.2.2a Set softswitches S1 and S2 (adjustable 1...99%)
Value of S2 must always be set at least 10% higher than value of S1.

Alarms **A2.2.3** Assign maintenance or fault alarms to feedback signal U5. Various criteria that output a maintenance or fault alarm on U5 can be defined. Depending on whether maintenance or fault has been defined for the criteria A2.2.3a - A2.2.3d, U5 outputs a specific signal when one of the criteria occurs.

② When the angle-of-rotation is limited mechanically (<95°) the angle must be adapted electronically in order to ensure the proper functions.







Note:
Any existing **maintenance alarms** will be cancelled when the MFT(2) actuator is disconnected from the power supply. However, maintenance alarms can also be cancelled with the MFT-H device (see page 18, Section A3.6).
- Any existing **fault alarms** can only be cancelled with the MFT-H device (see page 18, Section A3.6)

Stop/Go-Ratio A2.2.3a Criterion **actuator hunting** (typical cause: unstable control) selectable as maintenance or fault alarm.
Stop/Go-ratio is the ratio [%] of active time to operating time (operating time = No. of hours actuator connected to power supply. Active time = No. of hours MFT(2) actuator in mechanical motion while connected to power supply). A maintenance or fault alarm is generated if the **Stop/Go-ratio** exceeds a value of 20% (see also explanations on page 18, Section A3.5 Data log)

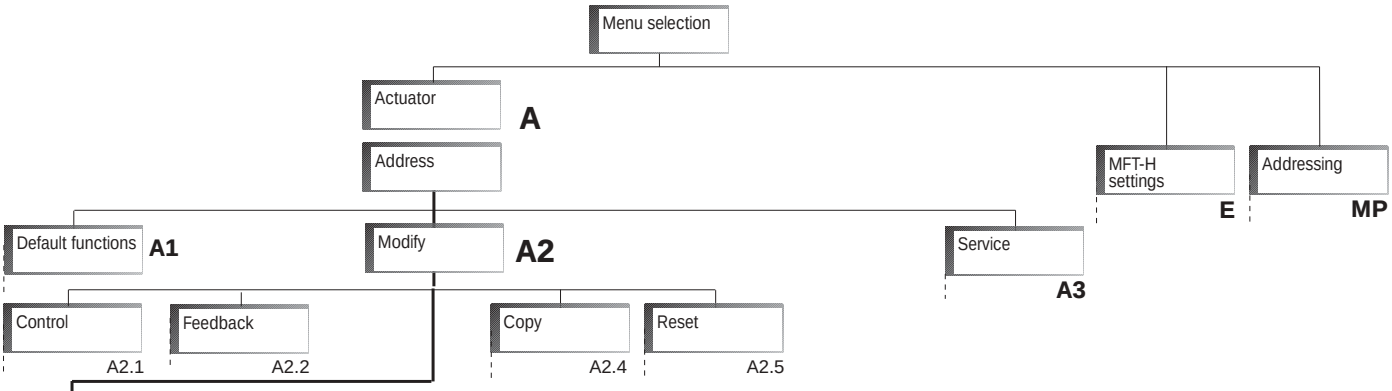
Mech. Overlast ② A2.2.3b Criterion **mechanical overload** (actuator stationary) selectable as maintenance or fault alarm.

Travel ② A2.2.3c Criterion **mechanical travel changed 10%** selectable as maintenance or fault alarm.

Alarms & U **A2.2.4** Combination of maintenance or fault alarms A2.2.3a – A2.2.3d and modulating DC measuring voltages A2.2.1a – A2.2.2b selectable. If a maintenance or fault alarm criterion is exceeded, the DC measuring voltage signal for the maintenance or fault signal are overridden.

Alarms & S **A2.2.5** Combination of maintenance or fault alarms A2.2.3a – A2.2.3c and softswitches S1 and S2 A2.2.2a – A2.2.2b selectable. If a maintenance or fault alarm criterion is exceeded, the softswitch signals for the maintenance or fault signal are overridden.

The feedback function required is selected with the directions keys ◄ ► and variable values are set with the direction keys ▼ ▲ and ▼ ▲. Pressing the SET key either causes the menu to jump to the next sub-menu or the selected values are entered into the actuator.



Motion

A2.3 The **Motion** branch of the tree menu allows the motion, running time and angle-of-rotation or stroke functions of the MFT(2) actuator to be defined.

Torque

A2.3.1 Select the torque or force of the MFT(2) actuator (not possible in the case of MFT(2) actuators with springs)

- 100 %: A2.3.1a Set torque or force to 100% (default value). Example: AM24-MFT(2) = 18 Nm
- 75 %: A2.3.1b Set torque or force to 75% of default value. Example: AM24-MFT(2) = 13.5 Nm
- 50 %: A2.3.1c Set torque or force to 50% of default value. Example: AM24-MFT(2) = 9 Nm
- 25 %: A2.3.1d Set torque or force to 25% of default value. Example: AM24-MFT(2) = 4.5 Nm

Running time

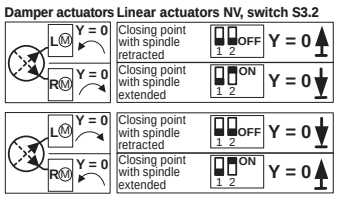
A2.3.2 Select running time of MFT(2) actuator

- Standard: A2.3.2a Set running time for 100% angle of rotation or stroke as default value. Example: AM24-MFT(2) = 150 s
- Variable …s 100 % Rotation: A2.3.2b Set running time for 100% angle of rotation or stroke anywhere within a range determinated. Note: The torque [Nm] and sound power level [dB] of the MFT(2) actuator might vary if the running time is less than the default value. Refer to the appropriate function graphs in the product information on MFT(2) actuators. The adjustable range of running time depends of the connected MFT(2) actuator.

Direction of rotation or lift

A2.3.3 Select the direction of rotation or lift of the MFT(2) actuator.

- Normal: A2.3.3a Set the direction of rotation or lift according to the symbols on the direction-of-rotation switch on the housing of the MFT(2) actuator or the settings of DIL switch S3.2 (closing point) on the linear actuator.
- Reverse: A2.3.3b Set the direction of rotation or lift opposite to the selected direction of rotation of the damper actuator or to the selected closing point of the linear actuator.



Rotation ②

A2.3.4
* For damper actuators and valve actuators select override positions and/or angle-of-rotation or stroke limits.
** For the VAV-Compact NMV-D2M select override positions and volumetric flow limits.
(For detailed functional descriptions see Product Information Documents * 2. + 6. MFT(2)-1 or ** 4. NMV-D2M-1)

- Minimum, Rotation …%: A2.3.4a Enter the MIN position. Adjustable: 0…100% referred to **MAX position**. For the VAV-Compact NMV-D2M: Set V_{MIN}. Adjustable: 0…100% referred to preset $\mathbf{V_{MAX}}$.
  Note: In the case of the AM24-SR and their configuration variants AM24-0xx the MIN position is referred to 0...100% ◁ angle of rotation.
- Intermediate, Rotation …%: A2.3.4b Enter the intermediate position. Adjustable: 0…100% referred to the control range set with the MIN and MAX positions. For the VAV-Compact NMV-D2M: Set V_{ZS}. Adjustable: 0…100% referred to the control range V_{MIN} and V_{MAX}.
- Maximum, Rotation …%: A2.3.4c Enter the MAX position. Adjustable : 0...100% ◁ angle of rotation or stroke (in the case of the VAV-Compact NMV-D2M referred to the nominal volumetric flow V_{NOM}).
  Note: In the case of actuators with a mechanically limited angle of rotation (<95°) the angle of rotation must be electronically adapted in order to ensure that the function is active (see also Document 2. + 6. MFT2-1)

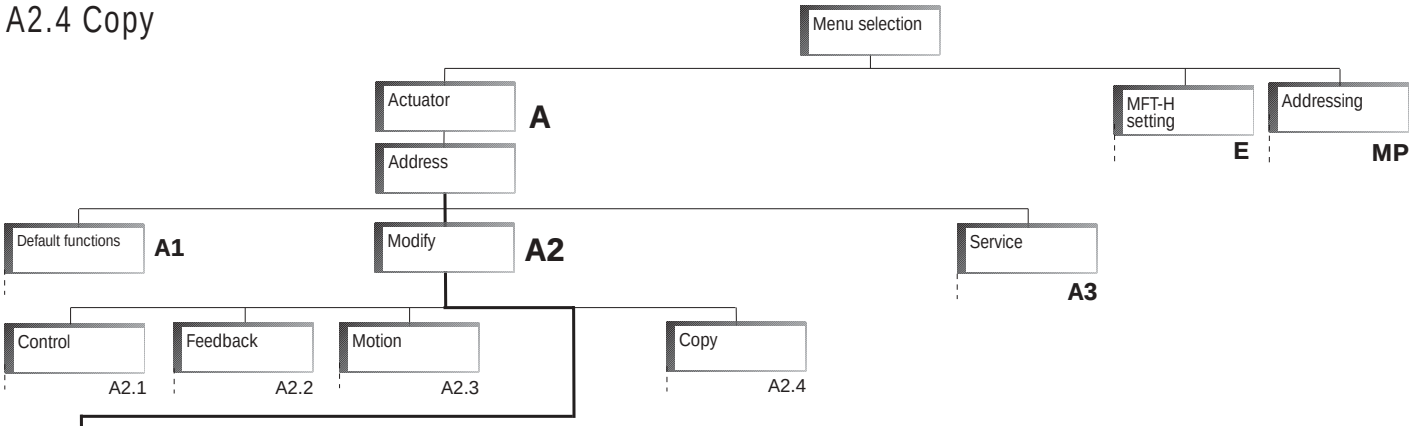
Adaption

A2.3.5 Select adaption (during adaption the measuring signal U5 is automatically adapted to the effective value of mechanical angle of rotation. The working range and the running time are adapted to the control range set with MIN and MAX).

- Off (Default): A2.3.5a **No adaption** (default)
- Manual: A2.3.5b To trigger adaption • NM24-MFT(2), AM24-MFT(2),GM24-MFT(2) and NMV-D2M by pressing the manual pushbutton twice. • LF24-MFT(2) and AF24-MFT(2) by moving the L/R switch back and forth twice.
- Auto: A2.3.5c Adaption triggered: Each power-up or when the functions described in A2.3.5b are implemented.

The functions required are selected with the directions keys ▼ ▲ and the variable values are set with the direction keys ▼ ▲. Pressing the SET key either causes the menu to jump to the next sub-menu or the selected values are entered into the actuator.

A2.4 Copy



Copy Actuator-Actuator

A2.4 Copy data record from one MFT(2) actuator to another.
Typical applications:
- Replacing a mechanically-defective MFT(2) actuator with a new unit
- Assigning parameters to a small series of actuators

Enter original — A2.4.1 Enter data from **Actuator 1** into the MFT-H device

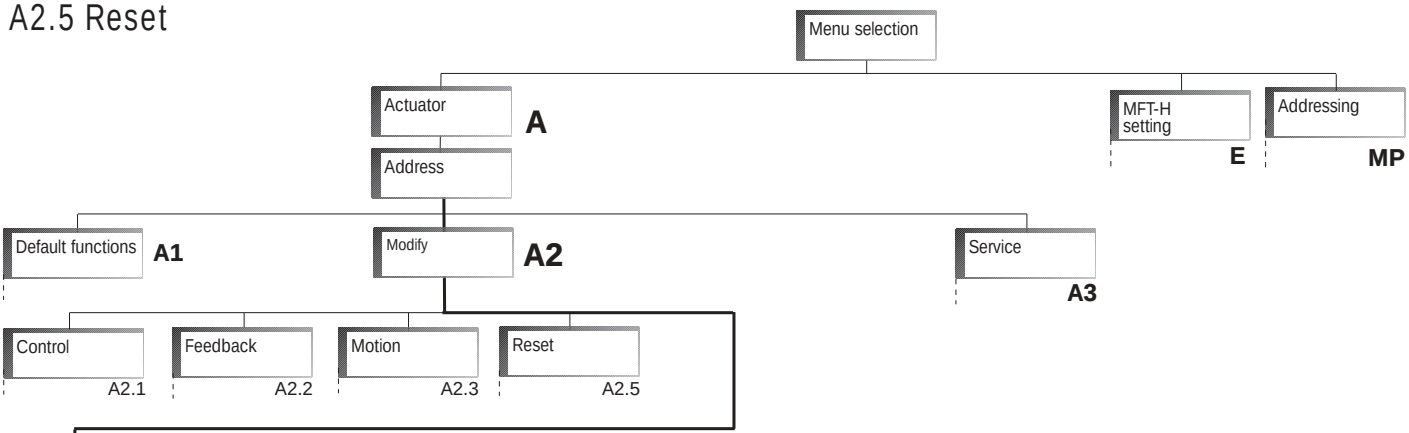
copy — A2.4.2 Load data received from Actuator 1 **into Actuator 2** or **other actuators**.

Important
The duplicating function can only be used if the type and the actuator configuration table are identical in both the original and the copy, otherwise a fault alarm will be given.

Copying procedure:

1. Connect the MFT-H device to the MFT(2) actuator from which the data is to be taken.
2. Use the **"Enter original"** function on the MFT-H device to transfer the data from the actuator to the device.
3. Disconnect the MFT-H device from the first actuator and connect it to the *next actuator*.
4. Use the **"Copy"** function on the MFT-H device to enter the data into the *next actuator*.

A2.5 Reset



Reset

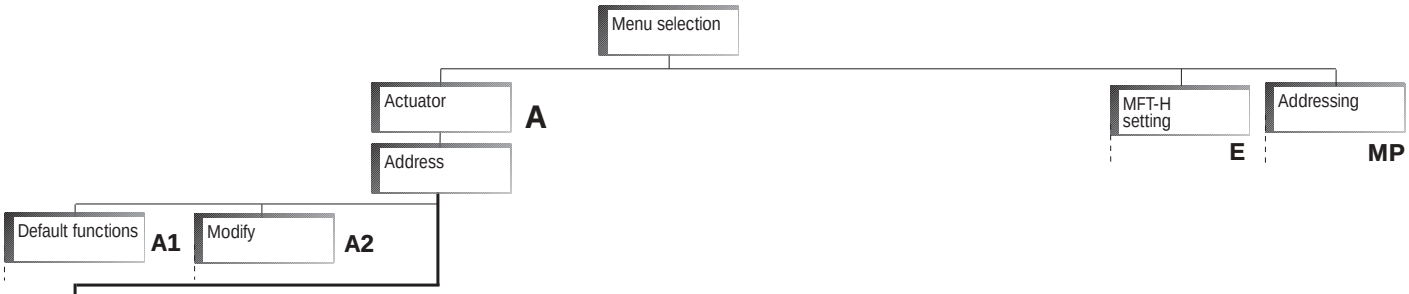
A2.5 **Reset any entry** already verified with the **SET** key.

Last entry — A2.5.1 **Reset the last entry** verified with the **SET** key.

All entries — A2.5.2 **Reset all entries** verified with the **SET** key since the last power-up of the MFT-H device.

Reset Original — In the case of VAV-Compact (NMV-D2M) resets V_{MIN}, V_{ZS} and V_{MAX} to the settings that were stored in the unit when it was delivered.

The functions required are selected with the directions keys ▼ ▲ . Pressing the SET key either causes the menu to jump to the next sub-menu or the selected functions are initiated.



Service

A3 In the **Service** branch of the tree menu it is possible to initiate service functions and to assign parameters to them, as well as accessing specific system data.

Identification

A3.1 **Identification** of the MFT(2) actuator.

Serial-No.

A3.1.1 Read out the **Serial No.** of the MFT(2) actuator.

Typ + SW version

A3.1.2 Read out the **Type / Software version** of the MFT(2) actuator.

Plant site .....

A3.1.3 Display the plant site string (if available, otherwise no function).

Reference/ Actual value

A3.2 **The actual position of the actuator as a percentage of the effective value of angle of rotation or stroke** (actual volumetric flow as a percentage of the nominal volumetric flow in the case of the VAV-Compact NMV-D2M) **can be compared with the reference value.** It is important to take into account that, in the case of electronically limited angles of rotation (or limited volumetric flow with the NMV-D2M), i.e. set with MIN and MAX positions – see Page 16, para. A2.3.4 – the working range of the actuator depends on the set values of MIN and MAX (V_{MIN} and V_{MAX} with the NMV-D2M). The Start point of the working range is at the MIN position and the Finish point at the MAX position (V_{MIN} and V_{MAX} in the case of the NMV-D2M). In addition, it is important to take into account that the MIN position is referred to the MAX position (V_{MIN} referred to V_{MAX} in the case of the NMV-D2M).

Adaption

A3.3 **Initiate angle-of-rotation adaption.** Adaption can be initiated by pressing the **SET** key. The MFT-H display verifies the initiation with the message *"Adaption in progress"*. During adaption, the actuator runs automatically to both end positions. It adapts the U5 feedback signal to the effective mechanical angle of rotation. The running time and the working range are adapted to the control range defined by MIN and MAX.

Function info

A3.4 Display the actual parameters of the MFT(2) actuator (actual data record)
Function: Use the direction keys ◄ ► to move one display line forward or back. When a line contains several parameters (e.g. various defined maintenance alarms, see page 15), the MFT-H device scrolls automatically after a few seconds.

Data log

A3.5 Display **Operating time** [h], **Active time** [h] and **Stop/Go-ratio** [ratio of active time to operating time]
Operating time = No. of hours actuator powered up.
Active time = No. of hours actuator powered up and moving.
Stop/Go-ratio = Ratio [%] of active time to operating time (calculate thus: active time [h] / operating time [h] x 100)
Example: An operating time of 100,000 h and an active time of 10,000 h gives a Stop/Go-ratio of 10%. If the Stop/Go-ratio is relatively high it might be due to unstable control triggering the actuator. Page 15 (A2.2.3a) describes how the **Stop/Go-ratio** can be defined as a criterion for maintenance and fault alarms. Use the direction keys ◄ ► to move between **operating time, active time** and **Stop/Go-ratio** in the menu.

Alarms

Delete

A3.6 Display maintenance and fault alarms generated by the actuator.
Whenever there are several alarms present, they can be displayed in succession by pressing the direction keys ◄ ► . Individual alarms can be cancelled by pressing the **SET** key. The message ***No alarms*** is displayed if there are no alarms present.

Function test

Note: During the function test the actuator must be receiving a 24 V AC power supply (see page 5, Diagram 1).

A3.7 **A simple GO/NO GO – test for functional testing.**
SEQUENCE
1. When the menu is selected a reference value corresponding to the preset MAX position is issued to the actuator by the Handy (default for MAX is 100%). The actuator continues running until it reaches the preset reference value.
2. When the **SET** key is pressed the Handy issues the actuator with a reference value which corresponds to the preset MIN position (default for MIN is 0%). The actuator continues running until it reaches the preset reference value.
3. The next time the **SET** key is pressed the Handy issues the actuator with a reference value which corresponds to 50% of the control range defined by MIN and MAX. (The value is 50% if the MIN and MAX positions are set to default). The actuator continues running until it reaches the preset reference value.

Note: The MIN position is referred to the preset MAX position.

Sensitivity

A3.8 Response sensitivity and reversal hysteresis are adjustable so that MFT(2) actuators do not respond to every oscillatory movement of the control signal. The service life of the equipment can be enhanced by a correct choice of these values. The values are defined as degrees of angle of rotation in the case of rotary actuators and as mm in the case of linear actuators. The values correspond to the amount by which the control signal must be changed in order to change the position of the actuator.

Normal (Default)

A3.8.1 Response sensitivity set to 1 degree (rotary actuators) or to 0.2 mm (linear actuators).
Reversal hysteresis set to 2.5 degrees (rotary actuators) or to 0.5 mm (linear actuators).

Reduced

A3.8.2 Settings for sensitive equipment: Response sensitivity set to 2 degrees (rotary actuators) or to 0.4 mm (linear actuators).
Reversal hysteresis set to 5.0 degrees (rotary actuators) or to 1.0 mm (linear actuators).

Synchronisation

A3.9 Definition of **Default position** (synchronisation)

Normal (Default)

A3.9.1 At initial commissioning, when the pushbutton is pressed, the actuator runs to default position ① or ② depending on the direction of rotation selected (see Table).

Sync. at 0%

A3.9.2 At each power-up (also after a power failure) the actuator runs to default position ① or ② depending on the direction of rotation selected (see Table).

Sync. at 100%

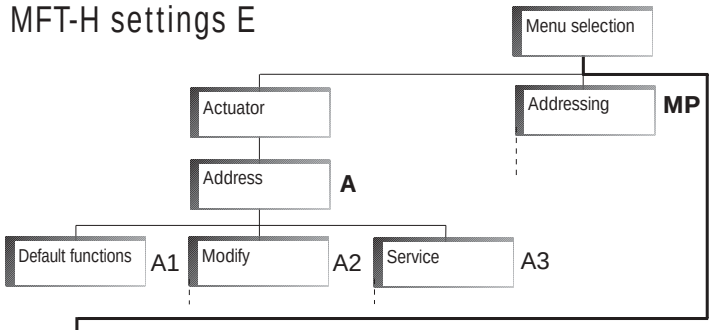
A3.9.3 At each power-up (also after a power failure) the actuator runs to default position ③ or ④ depending on the direction of rotation selected (see Table).

D of R switch	Default positions	
L Ⓜ Y = 0	① ccw	③ cw
R Ⓜ Y = 0	② cw	④ ccw

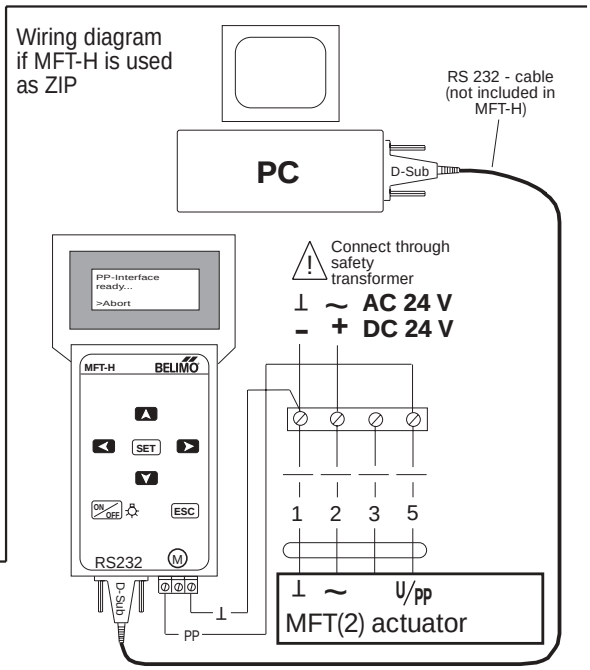
Note: If the direction of rotation is software-reversed (A2.3.3b, page 16), the default positions will be opposite.

The functions required are selected with the directions keys ▼ ▲ and ◄ ► Pressing the SET key either causes the menu to jump to the next sub-menu or actuator data can be displayed, deleted or entered into the actuator.

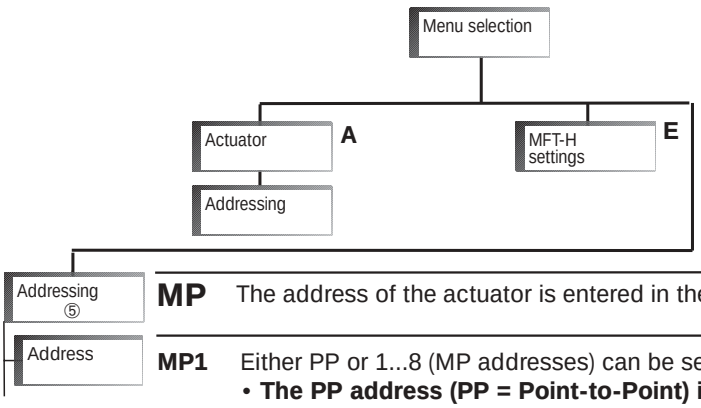
MFT-H settings E



MFT-H settings	**E**	Various modes of operation can be selected from the **MFT-H settings** branch of the tree menu.
Language	**E1**	MFT-H language of communication
German	E1.1	Select **German**
English	E1.1	Select **English**
further languages	E1.3-E1.10	currently in preparation
PP-interface	**E2**	MFT-H device in **PP-Interface** mode When the MFT-H device is switched to this mode, the display shows the message "*PP-Interface ready....*". The MFT-H can now be used as a level converter between an RS232 interface and a PP interface (ZIPfunction).
Software	**E3**	Display of **Software version** loaded in MFT-H device
SW version		



The functions required are selected with the direction keys ▼ ▲ and the variable values set with the directions keys ▼ ▲ . Pressing the SET key either causes the menu to jump to the next sub-menu or the selected values are entered into the actuator.



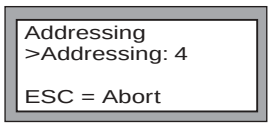
MP The address of the actuator is entered in the **Addressing** branch of the menu.

MP1 Either PP or 1...8 (MP addresses) can be selected in the “Address” menu.

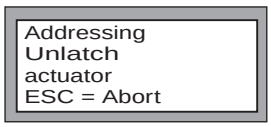
- **The PP address (PP = Point-to-Point) is selected** if there is only one MFT(2) actuator connected to the Handy (see Diagram 1 or Diagram 2 on Page 5). When an actuator is addressed with PP it is automatically parameterised for the classic mode of operation (no MP-Bus). In this case its control in the classic mode can be either modulating, 3-point, Open/Close or PWM. PP addressing is also used to reset an actuator that has previously been set for bus operation to the classic mode.
- **MP addresses 1...8 (MP = Multi Point) is selected** if there are several MFT(2) actuators connected to the Handy via the MP-Bus (see Diagram 3 on Page 5). This is because when there are several MFT(2) actuators communicating over the MP-Bus each one must be clearly identifiable.
  When an MFT(2) actuator is addressed with an MP address 1...8 it is automatically parameterised for MP-Bus operation. In this case it is controlled digitally over the MP-Bus.

Procedure for addressing an MFT(2) actuator:

1. Preselect the required address with the ▼ ▲ keys (Example: MP address 4)



2. Press the SET key and the following display will appear…



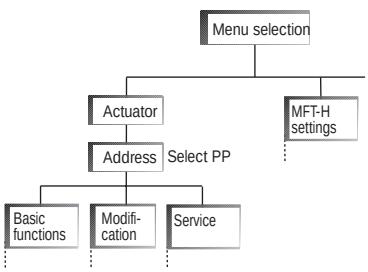
3. Perform the appropriate reset function on the MFT(2) actuator from the table below and according to what the *Handy* demands.

Actuator family	Actuator type	Reset function
Actuators without spring return	NM24-MFT(2), AM24-MFT(2), GM24-MFT(2), NMV-D2M	Press manual pushbutton 1x 
Actuators with spring return	LF24-MFT(2), AF24-MFT(2)	Move L/R switch back and forth 1x (within 4 s) 
Linear actuators for valves	NV24-MFT(2), NVF24-MFT(2), NVF24-MFT(2)-E	Press key S2 1x (inside the housing cover)

4. The following display appears briefly to show that the appropriate address has been assigned to the MFT(2) actuator:

The required address will have been assigned to the actuator when this procedure has been completed.

⑤ **Notes on parameterising AM24-SR’s**
The AM24-SR and its configuration variants AM24-xx (e.g. AM24-001) do not have a bus capability and so cannot be addressed. In order to set their parameters these types can be accessed directly via the Actuator/Address menu. In this case “PP” must be selected as the address.



Starting point for the examples of parameter assignment

```
Select menu
>Actuator
  Data records
  MFT-H settings
```

- When the MFT-H device is powered up, it always jumps directly to the menu step that was selected when it was powered down. In the following Examples, parameter assignment always begins in the main menu. Press the ESC key for at least 2 seconds in order to access the main menu.
- During parameter assignment, the MFT(2) actuator must be connected to the MFT-H device as shown in Diagrams 1 or 2 (see page 5).

1. Example: Parameterising an SRS function with a AM24-MFT(2) actuator

1.1 Preparation

a) Definition of required parameters

Working range	DC 3.5...6.6 V	
Function		
Feedback U5	DC 2...10 V	
Torque	min. 18 Nm	
Angle of rotation	95°	
Running time	150 s	
Angle-of-rotation adaption	none	
Overrides	Min. (Min.Pos.)	= 0%
(referred to the full	IP (Intermediate Pos.)	= 50%
angle of rotation of 95°)	Max. (Max.Pos.)	= 100%

b) Ascertain default function nearest to the final parameterising required.

To ascertain: The above data record is nearest to the default function SR (2...10 V DC). Therefore, the SR default function and the SR wiring diagram shown on page 12, Section A1.1 can be used as the basis.

1.2 Parameter assignment

a) Select menu

Press the ESC for 2 seconds.

Display

```
Select menu
>Actuator
  Data records
  MFT-H settings
```

b) Select *Actuator* menu

Press the SET key.

Display

```
Actuator
>Default functions
  Modify
  MFT-H settings
```

c) Select *Default functions* menu

Press the SET key

Display

```
Default functions
>SR (DC 2...10 V)
  PWM(0,59-2,93s)
  3-point
```

d) Load default function *SR (DC 2...10 V)* into the MFT damper actuator.

Press the SET key

Display

```
Modify
overwrite?
SET=Execute
ESC=Abort
```

Press the SET key

Display 1: during programming

```
Actuator being
programmed...
```

Display 2: SR (DC 2...10V) programmed

```
Default functions
>SR (DC 2...10 V)
  PWM(0,59-2,93s)
  3-point
```

A 2-beep signal gives audible confirmation...

e) Select *Modify* menu

Press the ESC key

Display

```
Actuator
>Default functions
  Modify
  Service
```

Press the ▼ key

Display

```
Actuator
>Default functions
  Modify
  Service
```

Press the SET key

Display

```
Modify
>Control
  Feedback
  Motion
```

f) Select *Control* menu

Press the SET key

Display

```
Control
>Control signal DCV
  Control signal PWM
  3-point
```

g) Select *Control signal DCV* menu

Press the SET key

Display 1: during programming

```
Actuator being
programmed...
```

Display 2: Control signal DCV has been loaded....

```
Control signal DC V
>DC 2-10 V
  DC 0-10 V
  DCV variable
```

A 2-beep signal gives audible confirmation...

h) Selected *DC variable* menu

Press the ▼ key twice until the cursor is opposite *DC variable*.

Display

```
Control signal DCV
  DC 2-10 V
  DC 0-10 V
>DCV variable
```

Press the SET key

Display

```
DCV variable
  Start        Finish
>  2.0V        10.0V
  ESC = Abort
```

i) Program SRS range

Hold the ▲ key depressed until Start shows *3.5 V*.

Display

```
DCV variable
  Start        Finish
>  3.5V        10.0V
ESC = Abort
```

Press the ➤ key

Display

```
DCV variable
  Start        Finish
  3.5V         >10.0V
ESC = Abort
```

Hold the ▼ key depressed until Finish shows *6.6 V*.

Display

```
DCV variable
  Start        Finish
  3.5V         >6.6V
ESC = Abort
```

Press the SET key

Display 1: during programming

```
Actuator being
programmed...
```

Display 2: Working range DC 3,5V-6.6 V programmed.

```
DCV variable
  Start        Finish
  3.5V         >6.6V
ESC = Abort
```

A 2-beep signal gives audible confirmation...

k) Labelling: Upon completion of programming, attach a label to the MFT(2) actuator showing the customised data (not identical to the AM24-SR basic type). A waterproof felt-tip pen will write on the special stickers provided (use 2 stickers if necessary).

```
Working range =
DC (3,5 - 6,6V)
```

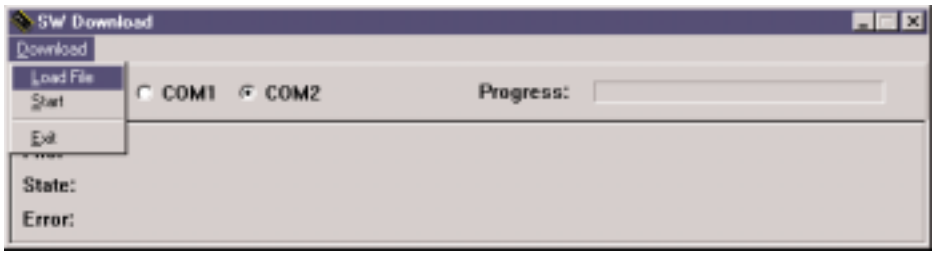
Data record parameterised

Instructions for a Handy software upgrade

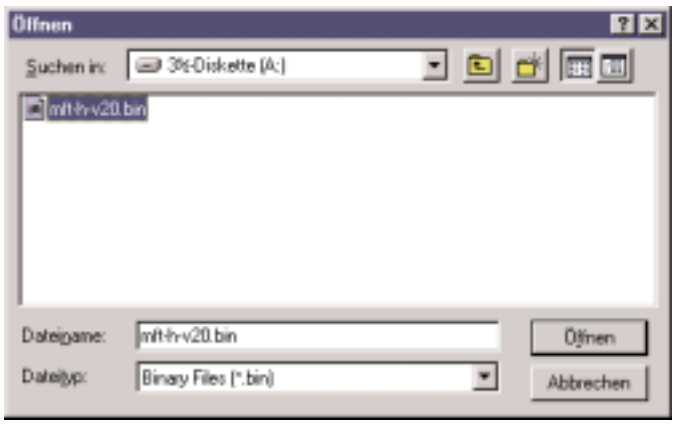
Before a software upgrade can be carried out a binary file containing the whole menu and the languages (Version 2.0 has German and English only, other languages are in preparation) must be loaded into the Handy. Use the “download20.exe” download program for this purpose.
The program can be started directly from the floppy disk (1.44 MB) or the hard disk.

System requirements and accessories needed:
- PC with **Windows 95/98/NT/2000** and at least 8 MB of RAM
- Available serial interface **COM1** or **COM2**
- Mouse for operating the software
- RS232 lead, for monitors, D-Sub 9-pin, male/female (no core crossing)

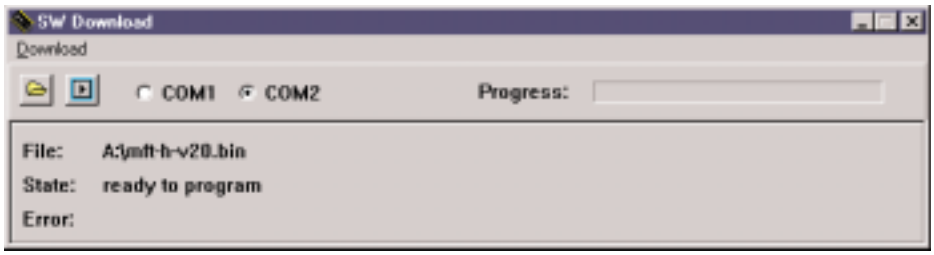
Procedure for upgrading MFT-H Handy’s:
Remove the red cap from the interface connector on the Handy and use the 9-pin D-Sub lead to connect to one of the PC’s serial interfaces COM1 or COM2.
Start the download program **download20.exe** from the hard disk or floppy and activate the appropriate interface, e.g. **COM2.**



In the menu, click on **[Download] [Load file]** or and ....



....open the binary file, e.g.
<<mft-h-v20.bin>>



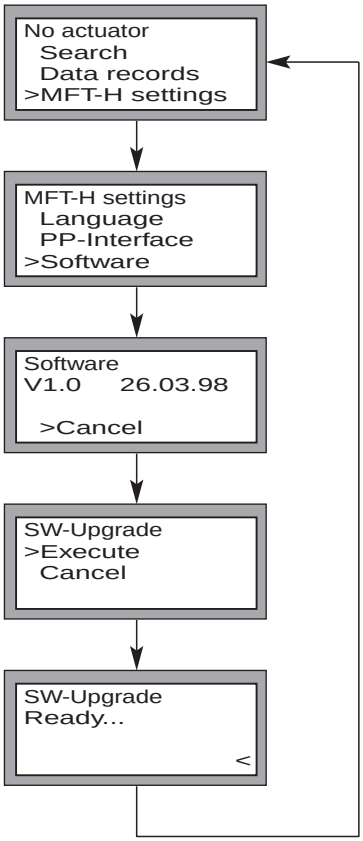
The file will have been loaded successfully if the <<ready to program>> message appears.

Preparing the Handy
Switch on the Handy and wait until it has finished its startup cycle (first-time Handy's jump to **[Language]** in the menu.

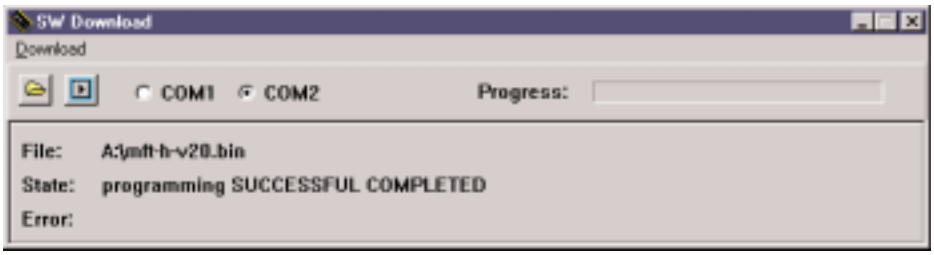
Select **[MFT-H settings]** in the menu and change to the **[Software]** menu.

Pressing **all 4 arrow keys** on the Handy at the same time for at least two seconds will cause the display to change to the hidden menu **[SW Upgrade].**

Select **[Execute]**
Note: Activating "Execute" deletes the old software immediately. This means that the Handy can no longer be used until the new software has been loaded.



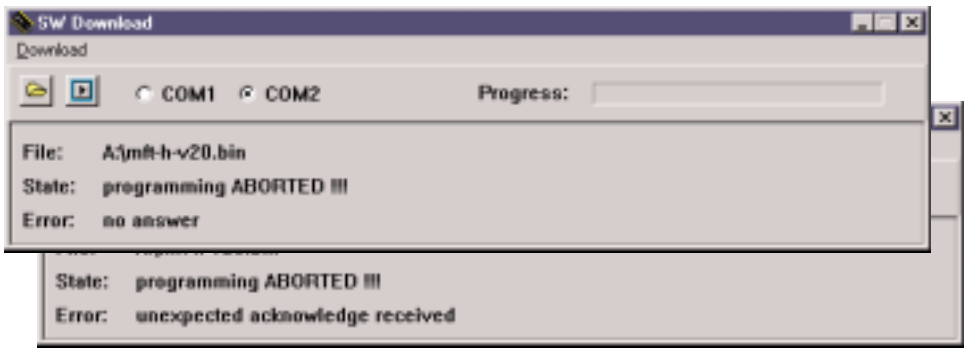
Loading a Handy with its new software
The message below and a flashing arrow (bottom right) indicate that the Handy is ready for the software download.
Downloading is started by using the mouse to click on **[Download]** and then **[Start]** or ▶. Download status is indicated at 'Progress' by means of a moving bar. While this function is in progress a solid square in the bottom right-hand corner of the Handy display will be flashing. Wait until the following status message appears (this may take a few minutes):



The Handy has now been successfully upgraded. It will then restart, give a single short beep and change to the Start Menu.

Programming other Handy's
If there are other Handy's to be upgraded with new software simply plug in the next one with the RS232 lead and proceed again as described above.

Errors during upgrading
Should downloading be impossible for any reason the following status message will appear on the display:



Check the following points:

- Is there a proper connection between the Handy and the appropriate serial interface COM1 or COM2?
- Are you sure there is really no core crossing in the RS232 lead?
- Is the Handy switched on and in SW Upgrade mode? (Is the arrow in the bottom right-hand corner of the display flashing?)

If everything appears to be OK, click on **[Start]** in the **[Download]** menu again. If it still does not work, switch the Handy off and on again, close the download software on the PC and restart it.

Air applications

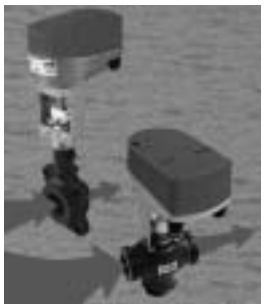
Standard actuators and spring-return actuators for air control dampers in HVAC systems

Safety actuators for motorizing fire and smoke extraction dampers

VAV systems for individual room air control

Water applications

Mixing actuators and motorized ball valves for HVAC water circuits



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